EMULEX

VAX DIAGNOSTICS

INSTALLATION AND USER'S GUIDE

DIAGNOSTIC MONITOR AND VERSION: VAX-11/780: ESSAA Version 6.0 or later
VAX-11/750: ECSAA Version 6.0 or later
VAX-11/730: ENSAA Version 6.0 or later
EMULEX SOFTWARE VERSION: VAX-DISK FORMATTER Version 2.0
VAX-DISK-EXERCISER Version 1.2
SC21 DIAGNOSTIC Version 1.6
TC11 DIAGNOSTIC Version 1.2
CS11 DIAGNOSTIC Version 1.1

EMULEX DISTRIBUTON MEDIA: VX9960401 Cartridge
VX9960501 Floppy Disk

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1.1 GENERAL DESCRIPTION

This program is used to format standard Digital Equipment Corporation (DEC) RM/RP disks, emulated through the Emulex SC750, SC780, SC21/V1 or SC31 disk controllers. Up to eight units can be concurrently selected for formatting.

1.2 REQUIREMENTS

For proper program installation, the following hardware and software requirements should be observed.

1.2.1 HARDWARE REQUIREMENTS

The hardware necessary to properly run this format program consists of the following: a VAX-11 processor with 128KW memory, a console device, an Emulex SC750, SC780, SC21 or SC31 disk controller, and at least one appropriate type of supported disk drive. It is assumed the VAX CPU, memory, and Unibus Adapter are known to be functioning properly..

1.2.2 SOFTWARE REQUIREMENTS

This program runs with the diagnostic supervisor ESSAA for the VAX-11/780 processor, ECSAA for the VAX-11/750 processor, or ENSAA for the VAX-11/730 processor, Version 6.0 or later, under the VAX VMS operating system or standalone under the Diagnostic Supervisor. The appropriate DEC Diagnostic Supervisor must be installed on the system disk in the [SYSMAINT] account. For an Emulex SC21 or SC31 controller installation the Emulex-supported VMS driver (UMDRIVER) is assumed to have been installed as described in the software installation manual if the program is to be run in the On-Line mode. If this installation is for an SC750 or SC780 controller, the standard DEC VMS disk drivers are assumed to have been properly patched, if required, as described in the appropriate Emulex controller installation manual.

1.3 LOADING PROCEDURES

The complete program loading requires six procedures.

1.3.1 COPYING THE FILES ONTO THE SYSTEM DISK

The Emulex diagnostics are contained entirely on one floppy disk (Emulex part number VX9960501), or on one TU58 cassette (Emulex part number VX9960401), as appropriate to the system. To copy the program files, you must use the FLX utility program, since all VAX console media are recorded in RT11 format.

You must first log into a privileged account, then set your default directory to [SYSMAINT].

```
        username: SYSTEM
        password:

        Welcome to VAX/VMS version V3.n

        $ MCR SYSGEN
        SYSGEN> CONNECT CONSOLE
        SYSGEN> EXIT
        $ SET DEF [SYSMAINT]
        $ MCR FLX
        FLX> /RS=CS1:*.730/RT
        FLX> /RS=CS1:*.750/RT
        FLX> /RS=CS1:*.780/RT
        FLX> /RS=CS1:*.HLP/RT
        FLX> /RS/IM=CS1:*.EXE/RT/IM
        FLX> ^Z
        $ LOG
```

NOTE

The .EXE files must be copied by using the Image mode (/IM) switch. Do not use the /IM switch when copying the .COM and .HLP files.

1.3.2 STARTING THE DIAGNOSTIC SUPERVISOR -- VAX-11/780

To begin an On-Line diagnostic session, you must first log into the system maintenance account and invoke the DEC Diagnostic Supervisor. To accomplish this procedure, enter the following underlined inputs:

```
        username: FIELD
        password: (service)

        Welcome to VAX/VMS version V3.n

        $ RUN ESSAA(cr)
```

This instruction loads the Diagnostic Supervisor into memory which
then announces itself with:

DIAGNOSTIC SUPERVISOR. ZZ-ESSAA-6.n-xxx
DS>

1.3.2.1 Starting the Diagnostic Supervisor (Off-Line)

To begin an Off-Line diagnostic session, you must first bootstrap
the DEC Diagnostic Supervisor. To accomplish this procedure, remove
the floppy disk labeled "Local Console" from the drive, and insert
the Diagnostic Supervisor floppy disk, then enter the following
instruction:

```
>>>^P
>>>HALT
>>>BOOT
```

This instruction loads the Diagnostic Supervisor into memory which
then announces itself with:

DIAGNOSTIC SUPERVISOR. ZZ-ESSAA-6.n-xxx
DS>

1.3.3 OPERATING PROCEDURES FOR THE VAX-11/780

The desired disk device must now be attached and selected. There
are two ways in which this procedure can be done: by using the
Prompt mode, or by using the Explicit (No Prompt) mode. Examples
for each procedure are listed in Tables 1-1 and 1-2. The underlined
text indicates information which needs to be typed into the console
by the user. It should follow the Diagnostic Supervisor Prompt
symbol which is "DS>" or "?".

Table 1-1. Prompt Mode, VAX-11/780

SC780	SC21/SC31
DS> LOAD EDSKF	DS> LOAD EDSKF
DS> ATTACH	DS> ATTACH
DEVICE TYPE ? RH780	DEVICE TYPE ? DW780
DEVICE LINK ? SBI	DEVICE LINK ? SBI
DEVICE NAME ? RH0	DEVICE NAME ? DW0
TR ? 11	TR ? 3
BR ? 5	BR ? 4
DS> ATTACH	DS> ATTACH
DEVICE TYPE ? RM	DEVICE TYPE ? SC21*
DEVICE LINK ? RH0	DEVICE LINK ? DW0
DEVICE NAME ? DRA0	DEVICE NAME ? UMA0
DS> SELECT DRA0	CSR ? 776700
	VECTOR ? 254
	DS> SELECT UMA0

*or SC31

1-3

Table 1-2. Explicit Mode, VAX-11/780

SC780	SC21/SC31
DS> LOAD EDSKF	DS> LOAD EDSKF
DS> ATT RH780 SBI RH0 5 11	DS> ATT DW780 SBI DW0 3 4
DS> ATT RM RH0 DRA0	DS> ATT SC21* DW0 UMA0 776700 254
DS> SEL DRA0	DS> SEL UMA0

*or SC31

Once the Unit Under Test (UUT) has been ATTached and SELected, the diagnostic program must be started as follows:

DS> STart[/(switches)]

See the VAX Diagnostic User's Guide, DEC part number EK-VX11D-UG for the description of the available switches.

1.3.4   STARTING THE DIAGNOSTIC SUPERVISOR -- VAX-11/750

To begin an On-Line diagnostic session, you must first log into the system maintenance account and invoke the DEC Diagnostic Supervisor. To accomplish this procedure, enter the following underlined inputs:

username: FIELD
password: (service)

Welcome to VAX/VMS version V3.n

$ RUN ECSAA(cr)

This instruction loads the Diagnostic Supervisor into memory which then announces itself with:

DIAGNOSTIC SUPERVISOR. ZZ-ECSAA-6.n-xxx
DS>

1.3.4.1   Starting the Diagnostic Supervisor (Off-Line)

To begin an Off-Line diagnostic session, you must first bootstrap the DEC Diagnostic Supervisor. To accomplish this procedure, remove the TU58 cassette labeled "Local Console" from the drive, insert the Diagnostic Supervisor cassette, place the bootstrap device select switch in the TU58 position (usually position "A"), and press the RESET button. This procedure loads the Diagnostic Supervisor into memory which then announces itself with:

DIAGNOSTIC SUPERVISOR. ZZ-ECSAA-6.n-xxx
DS>

1.3.5 OPERATING PROCEDURES FOR THE VAX-11/750

The desired disk device must now be attached and selected. There are two ways in which this procedure can be done: by using the Prompt mode, or by using the Explicit (No Prompt) mode. Examples for each procedure are listed in Tables 1-3 and 1-4. The underlined text indicates information which needs to be typed into the console by the user. It should follow the Diagnostic Supervisor Prompt symbol which is "DS>" or "?".

Table 1-3. Prompt Mode, VAX-11/750

SC750	SC21/SC31
DS> LOAD EDSKF	DS> LOAD EDSKF
DS> ATTACH	DS> ATTACH
DEVICE TYPE ? RH750	DEVICE TYPE ? DW750
DEVICE LINK ? CMI	DEVICE LINK ? CMI
DEVICE NAME ? RH0	DEVICE NAME ? DW0
DS> ATTACH	DS> ATTACH
DEVICE TYPE ? RM	DEVICE TYPE ? SC21*
DEVICE LINK ? RH0	DEVICE LINK ? DW0
DEVICE NAME ? DRA0	DEVICE NAME ? UMA0
DS> SELECT DRA0	CSR ? 776700
	VECTOR ? 254
	DS> SELECT UMA0

*or SC31

Table 1-4. Explicit Mode, VAX-11/750

SC750	SC21/SC31
DS> LOAD EDSKF	DS> LOAD EDSKF
DS> ATT RH750 SBI RH0	DS> ATT DW750 SBI DW0
DS> ATT RM RH0 DRA0	DS> ATT SC21* DW0 UMA0 776700 254
DS> SEL DRA0	DS> SEL UMA0

*or SC31

Once the UUT has been ATTached and SELected, the diagnostic program must be started as follows:

DS> STart[/(switches)]

See the VAX Diagnostic User's Guide, DEC part number EK-VX11D-UG for the description of the available switches.

1.3.6   STARTING THE DIAGNOSTIC SUPERVISOR -- VAX-11/730

To begin an On-Line diagnostic session, you must first log into the
system maintenance account and invoke the DEC Diagnostic
Supervisor. To accomplish this procedure, enter the following
underlined inputs:

    username: FIELD
    password: (service)

    Welcome to VAX/VMS version V3.n

    $ RUN ENSAA(cr)

This instruction loads the Diagnostic Supervisor into memory which
then announces itself with:

    DIAGNOSTIC SUPERVISOR. ZZ-ENSAA-6.n-xxx
    DS>

1.3.6.1   Starting the Diagnostic Supervisor (Off-Line)

To begin an Off-Line diagnostic session, you must first bootstrap
the DEC Diagnostic Supervisor. To accomplish this procedure, remove
the TU58 cassette labeled "Local Console" from the Internal drive
(unit 1) and insert the "Load Path" diagnostic cassette (#37), then
insert the Emulex diagnostic cassette in the External drive (unit
0), and enter the following underlined inputs:

    >>>I
    >>>L/P/S:FE00 DD1:ENSAA.EXE
    >>>S 10000

This instruction loads the Diagnostic Supervisor into memory which
then announces itself with:

    DIAGNOSTIC SUPERVISOR. ZZ-ENSAA-6.n-xxx
    DS>

1.3.7   OPERATING PROCEDURES FOR THE VAX-11/730

The desired disk device must now be attached and selected. There
are two ways in which this procedure can be done: by using the
Prompt mode, or by using the Explicit (No Prompt) mode. Examples
for each procedure are listed in Tables 1-5 and 1-6. The underlined
text indicates information which needs to be typed into the console
by the user. It should follow the Diagnostic Supervisor Prompt
symbol which is "DS>" or "?".

Table 1-5. Prompt Mode, VAX-11/730

SC21/SC31

```
DS> LOAD EDSKF
DS> ATTACH
DEVICE TYPE ? DW730
DEVICE LINK ? HUB
DEVICE NAME ? DW0
DS> ATTACH
DEVICE TYPE ? SC21*
DEVICE LINK ? DW0
DEVICE NAME ? UMA0
CSR ? 776700
VECTOR ? 254
DS> SELECT UMA0
```

---

*or SC31

Table 1-6. Explicit Mode, VAX-11/730

SC21/SC31

```
DS> LOAD EDSKF
DS> ATT DW730 HUB DW0
DS> ATT SC21* DW0 UMA0 776700 254
DS> SEL UMA0
```

---

*or SC31

Once the UUT has been ATTached and SELected, the diagnostic program must be started as follows:

DS> STart[/(switches)]

See the VAX Diagnostic User's Guide, DEC part number EK-VX11D-UG for the description of the available switches.

1.4 PROGRAM DESCRIPTION

The formatter may be used to select one of eight functions (sections) which are described below. Some functions are common to most sections; with the exception of HELP, INITSF, and REBUILD, all sections begin by reading the bad sector file (or the skip sector file if applicable), verifying the format of the file, and displaying the contents of the file. If the file is either unreadable or corrupted, the section is aborted. The operator should then use section INITSF to restore the file to a known, valid state.

Any section which Writes to the disk, checks to ensure that the mounted volume is labeled "SCRATCH". If not, a warning message is printed and the operator is requested to indicate whether the program is or is not to continue.

Since this formatter supports both disks which employ skip sectoring (RM80) and those which do not (RM02/03/05, and RP05/06), descriptions below and messages printed by the diagnostic itself may make parenthetical references to the skip sector file. These references should be ignored, if not applicable.

1.4.1 HELP SECTION

This section prints a description of the operation of the formatter, including:

- Types of disks supported,
- List and description of the sections,
- List and description of the event flags which are
        applicable to formatter operation.

1.4.2 FORVER SECTION

This section has two functions: initialize bad sectors and to format a new or corrupt disk pack.

First, this section initializes the bad sector file (or the skip sector file if applicable for the selected disk) to no entries. Before initializing the bad (or skip) sector file, a warning message is displayed and the operator is asked to either continue or abort. This section requires the operator to enter the desired volume serial number (which is stored in the bad or skip sector file).

Second, this section formats a new or corrupted pack. The pack is formatted one track at a time. A surface analysis is performed at the completion of the format, and any bad sector discovered is flagged and added to the bad (or skip) sector file. The homeblock is written with the name "SCRATCH". The user should be aware that the bad (or skip) sector file is not updated until the surface verification is fully completed.

1.4.3 VERIFY SECTION

This section is used to perform a surface analysis of the selected disk. Any bad sectors found are flagged and added to the bad (or skip) sector file. The homeblock is written with the name "SCRATCH". The user should be aware that the bad (or skip) sector file is not updated until surface verification is fully completed.

1.4.4 READALL SECTION

This section is used to Read every sector on the pack and to print a report of any errors found. This section does not Write to the disk and may therefore be used with a non-scratch pack that contains no warning. The error report produced indicates whether the error found was or was not previously flagged.

1.4.5 UPDATE SECTION

This section is used to manually add entries to the bad (or skip) sector file. The operator indicates whether the entries to be added are logical block numbers or physical specifications (cylinder, track, sector). This section should not be used unless the user has a complete understanding of the use and structure of the bad (or skip) sector file).

1.4.6 REBUILD SECTION

This section is a combination of FORVER and UPDATE. The bad (or skip) sector file is initialized, after which the operator may manually enter the desired entries in the file.

1.4.7 DISPLAY SECTION

This section is used to display the contents of the bad (or skip) sector file. This program section performs Read-only operations which may be used with a non-scratch disk that contains no warning.

1.5 PROGRAM OPTIONS

Program options use the following Event Flags:

Quick: If set, reduces the number of track Read
                    operations from five to one during
                    verification.

Event Flag 23:   If set, causes the logical block number to be
                    printed after each track accessed

Event Flag 22:   If set, causes the logical block number to be
                    printed after every 100 cylinders accessed

Event Flag 21:   If set, causes shortened error messages (only
                    device register contents, not bus adapter
                    register contents)

Event Flag 20:   If set, forces single-track access in
                    Stand-Alone mode

```
Event Flag 19:        If set, causes only the FE cylinders to be
                      formatted

Event Flag 18:        If set, causes bypass of the surface
                      verification
```

1.6 DISTRIBUTION

The SC750/SC780, SC21/SC31 Disk Formatter Program is contained
entirely on one floppy disk (Emulex part number VX9960501), or on
one TU58 cassette (Emulex part number VX9960401), as appropriate to
the system.   The contents of this unit which apply to the
SC750/SC780 and SC21/SC31 are defined as follows:

    EDSKF.EXE   The SC750/SC780, SC21/SC31 disk
                         formatter program executable image.

The listings for the Emulex SC750/780, SC21/SC31 Disk Formatter
Program are identified as Emulex part number VX9960061.   These
listings contain the assembly list file (EDSKF.LIS) and the MAP
file (EDSKF.MAP) of the SC750/SC780, SC21/SC31 Disk Formatter
Program.

NOTE
These listing files are proprietary information
that belong to Emulex. They are released only with
appropriate Software Source license.

2.1 GENERAL DESCRIPTION

This program is designed to exercise standard Digital Equipment Corporation (DEC) RM/RP/RK disks and additional expanded disk configurations supported by the Emulex SC750, SC780, SC12/V, SC21/V1 and SC31 disk controllers.

2.2 REQUIREMENTS

For proper program installation, the following hardware and software requirements should be observed.

2.2.1 HARDWARE REQUIREMENTS

The hardware necessary to properly run this diagnostic test consists of the following components: a VAX-11 processor with 128KW memory, a console device, an Emulex SC750, SC780 SC12, SC21, or SC31 disk controller and at least one appropriate type of supported disk drive. It is assumed that the VAX CPU, memory, and Unibus Adapter are known to be functioning properly.

2.2.2 SOFTWARE REQUIREMENTS

This program runs with the diagnostic supervisor ESSAA for the VAX-11/780 processor, ECSAA for the VAX-11/750 processor, or ENSAA for the VAX-11/730 processor, Version 6.0 or later, under the VAX VMS operating system or standalone under the Diagnostic supervisor. The appropriate DEC Diagnostic Supervisor must be installed on the system disk in the [SYSMAINT] account. For an Emulex SC21 or SC31 controller installation, the Emulex-supported VMS driver (UMDRIVER) is assumed to have been installed as described in the software installation manual. If this installation is for an SC750 or SC780 controller, the standard DEC VMS disk drivers are assumed to have been properly patched, if required, as described in the appropriate installation manual.

2.3 LOADING PROCEDURES

The complete program loading requires seven procedures.

2.3.1 COPYING THE FILES ONTO THE SYSTEM DISK

The Emulex diagnostics are contained entirely on one floppy disk
(Emulex part number VX9960501), or on one TU58 cassette (Emulex
part number VX9960401), as appropriate to the system. To copy the
program files you must use the FLX utility program since all VAX
console media are recorded in RT11 format.

You must first log into a privileged account, then set your default
directory to [SYSMAINT].

        username: <u>SYSTEM</u>
        password:

        Welcome to VAX/VMS version V3.n

        $ <u>MCR SYSGEN</u>
        SYSGEN> <u>CONNECT CONSOLE</u>
        SYSGEN> <u>EXIT</u>
        $ <u>SET DEF [SYSMAINT]</u>
        $ <u>MCR FLX</u>
        FLX> <u>/RS=CS1:*.730/RT</u>
        FLX> <u>/RS=CS1:*.750/RT</u>
        FLX> <u>/RS=CS1:*.780/RT</u>
        FLX> <u>/RS=CS1:*.HLP/RT</u>
        FLX> <u>/RS/IM=CS1:*.EXE/RT/IM</u>
        FLX> <u>^Z</u>
        $ <u>LOG</u>

                            NOTE

            The .EXE files must be copied by using the
            Image mode (/IM) switch. Do not use the /IM
            switch when copying the .COM and .HLP files.

2.3.2 STARTING THE DIAGNOSTIC SUPERVISOR -- VAX-11/780

To begin an On-Line diagnostic session, you must first log into the
system maintenance account and invoke the DEC Diagnostic
Supervisor. To accomplish this procedure, enter the following
underlined inputs:

        username: <u>FIELD</u>
        password: (service)

        Welcome to VAX/VMS version V3.n

        $ <u>RUN ESSAA(cr)</u>

This instruction loads the Diagnostic Supervisor into memory which
then announces itself with:

        DIAGNOSTIC SUPERVISOR. ZZ-ESSAA-6.n-xxx
        DS>

2.3.2.1 Starting the Diagnostic Supervisor (Off-Line)

To begin an Off-Line diagnostic session, you must first bootstrap the DEC Diagnostic Supervisor. To accomplish this procedure, remove the floppy disk labeled "Local Console" from the drive, insert the Diagnostic Supervisor floppy disk, then enter the following instruction:

```
>>>^P(cr)
>>>HALT(cr)
>>>BOOT(cr)
```

This instruction loads the Diagnostic Supervisor into memory which then announces itself with:

```
DIAGNOSTIC SUPERVISOR. ZZ-ESSAA-6.n-xxx
DS>
```

2.3.3 OPERATING PROCEDURES FOR THE VAX-11/780

The desired disk device must now be attached and selected. There are two ways in which this procedure can be done: by using the Prompt mode, or by using the Explicit (No Prompt) mode. Examples for each procedure are listed in Tables 2-1, and 2-2. The underlined text indicates information which needs to be typed into the console by the user. It should follow the Diagnostic Supervisor Prompt symbol which is "DS>" or "?".

Table 2-1. Prompt Mode, VAX-11/780

SC21/SC31	SC780
DS> LOAD EDSKR	DS> LOAD EDSKR
DS> ATTACH	DS> ATTACH
DEVICE TYPE ? RH780	DEVICE TYPE ? DW780
DEVICE LINK ? SBI	DEVICE LINK ? SBI
DEVICE NAME ? RH0	DEVICE NAME ? DW0
TR ? 11	TR ? 3
BR ? 5	BR ? 4
DS> ATTACH	DS> ATTACH
DEVICE TYPE ? RM	DEVICE TYPE ? SC21
DEVICE LINK ? RH0	DEVICE LINK ? DW0
DEVICE NAME ? DRA0	DEVICE NAME ? UMA
DS> SELECT DRA0	CSR ? 776700
	VECTOR ? 254
	BR ? 5
	DS> SELECT UMA

Table 2-2. Explicit Mode, VAX-11/780

SC780	SC21/SC31
DS> LOAD EDSKR	DS> LOAD EDSKR
DS> ATT RH780 SBI RH0 5 11	DS> ATT DW780 SBI DW0 3 4
DS> ATT RM RH0 DRA0	DS> ATT SC21 DW0 UMA 776700 254 5
DS> SEL DRA0	DS> SEL UMA

Once the Unit Under Test (UUT) has been ATTached and SELected, the diagnostic program must be started as follows:

DS> STart[/(switches)]

See the VAX Diagnostic User's Guide, DEC part number EK-VX11D-UG for the description of the available switches.

2.3.4 STARTING THE DIAGNOSTIC SUPERVISOR -- VAX-11/750

To begin an On-Line diagnostic session, you must first log into the system maintenance account and invoke the DEC Diagnostic Supervisor. To accomplish this procedure, enter the following underlined inputs:

    username: FIELD
    password: (service)

    Welcome to VAX/VMS version V3.n

    $ RUN ECSAA(cr)

This instruction loads the Diagnostic Supervisor into memory which then announces itself with:

    DIAGNOSTIC SUPERVISOR. ZZ-ECSAA-6.n-xxx
    DS>

2.3.4.1 Starting the Diagnostic Supervisor (Off-Line)

To begin an Off-Line diagnostic session, you must first bootstrap the DEC Diagnostic Supervisor. To accomplish this procedure, remove the TU58 cassette labeled "Local Console" from the drive, insert the Diagnostic Supervisor cassette, place the bootstrap device select switch in the TU58 position (usually switch position "A"), and press the RESET button. This procedure loads the Diagnostic Supervisor into memory which then announces itself with:

    DIAGNOSTIC SUPERVISOR. ZZ-ECSAA-6.n-xxx
    DS>

2.3.5 OPERATING PROCEDURES FOR THE VAX-11/750

The desired disk device must now be attached and selected. There are two ways in which this procedure can be done: by using the Prompt mode, or by using the Explicit (No Prompt) mode. Examples for each procedure are listed in Tables 2-3, and 2-4. The underlined text indicates information which needs to be typed into the console by the user. It should follow the Diagnostic Supervisor Prompt symbol which is "DS>" or "?".

Table 2-3. Prompt Mode, VAX-11/750

SC750	SC21/SC31
DS> LOAD EDSKR	DS> LOAD EDSKR
DS> ATTACH	DS> ATTACH
DEVICE TYPE ? RH750	DEVICE TYPE ? DW750
DEVICE LINK ? CMI	DEVICE LINK ? CMI
DEVICE NAME ? RH0	DEVICE NAME ? DW0
DS> ATTACH	DS> ATTACH
DEVICE TYPE ? RM	DEVICE TYPE ? SC21
DEVICE LINK ? RH0	DEVICE LINK ? DW0
DEVICE NAME ? DRA0	DEVICE NAME ? UMA
DS> SELECT DRA0	CSR ? 776700
	VECTOR ? 254
	BR ? 5
	DS> SELECT UMA

Table 2-4. Explicit Mode, VAX-11/750

SC750	SC21/SC31
DS> LOAD EDSKR	DS> LOAD EDSKR
DS> ATT RH750 SBI RH0	DS> ATT DW750 SBI DW0
DS> ATT RM RH0 DRA0	DS> ATT SC21 DW0 UMA 776700 254 5
DS> SEL DRA0	DS> SEL UMA

Once the UUT has been ATTached and SELected, the diagnostic program must be started as follows:

DS> STart[/(switches)]

See the VAX Diagnostic User's Guide, DEC part number EK-VX11D-UG for the description of the available switches.

2.3.6 STARTING THE DIAGNOSTIC SUPERVISOR -- VAX-11/730

To begin an On-Line diagnostic session, you must first log into the system maintenance account and invoke the DEC Diagnostic Supervisor. To accomplish this procedure, enter the following underlined inputs:

    username: FIELD
    password: (service)

    Welcome to VAX/VMS version V3.n

    $ RUN ENSAA(cr)

This instruction loads the Diagnostic Supervisor into memory, which then announces itself with:

    DIAGNOSTIC SUPERVISOR. ZZ-ENSAA-6.n-xxx
    DS>

2.3.6.1 Starting the Diagnostic Supervisor (Off-Line)

To begin an Off-Line diagnostic session, you must first bootstrap the DEC Diagnostic Supervisor. To accomplish this procedure, remove the TU58 cassette labeled "Local Console" from the internal drive (unit 1), and insert the "Load Path" diagnostic cassette (#37). Then insert the Emulex diagnostic cassette in the External drive (unit 0), and enter the following underlined inputs:

    >>>I(cr)
    >>>L/P/S:FE00 DD1:ENSAA.EXE(cr)
    >>>S 10000(cr)

This instruction loads the Diagnostic Supervisor into memory which then announces itself with:

    DIAGNOSTIC SUPERVISOR. ZZ-ENSAA-6.n-xxx
    DS>

2.3.7 OPERATING PROCEDURES FOR THE VAX-11/730

The SC12, SC21 or SC31 device must now be ATTached and SELected. There are two ways in which this procedure can be done: by using the Prompt mode, or by using the Explicit (No Prompt) mode. Examples for each procedure are listed in Tables 2-5 and 2-6. The underlined text indicates information which needs to be typed into the console by the user. It should follow the Diagnostic Supervisor Prompt symbol which is " DS>" or "?".

Table 2-5. Prompt Mode, VAX-11/730

SC12	SC21/SC31
DS> LOAD EDSKR	DS> LOAD EDSKR
DS> ATTACH	DS> ATTACH
DEVICE TYPE ? DW730	DEVICE TYPE ? DW730
DEVICE LINK ? HUB	DEVICE LINK ? HUB
DEVICE NAME ? DW0	DEVICE NAME ? DW0
DS> ATTACH	DS> ATTACH
DEVICE TYPE ? RK611	DEVICE TYPE ? SC21
DEVICE LINK ? DW0	DEVICE LINK ? DW0
DEVICE NAME ? DRA0	DEVICE NAME ? UMA
DEVICE NAME ? DMA	CSR ? 776700
CSR ? 777440	VECTOR ? 254
VEC ? 210	BR ? 5
BR ? 5	DS> SELECT UMA
DS> ATTACH	
DEVICE TYPE ? RK	
DEVICE LINK ? DMA	
DEVICE NAME ? DMA0	
DS> SELECT DMA0	

Table 2-6. Explicit Mode, VAX-11/730

SC12	SC21/SC31
DS> LOAD EDSKR	DS> LOAD EDSKR
DS> ATT DW730 HUB DW0	DS> ATT DW730 HUB DW0
DS> ATT RK611 DW0 DMA 777440 210 5	DS> ATT UM DW0 UMA 776700 254 5
DS> ATT RK DMA DMA0	DS> SEL UMA
	DS> SELECT DMA0

Once the UUT has been ATTached and SELected, the diagnostic program must be started as follows:

DS> STart[/(switches)]

See the VAX Diagnostic User's Guide, DEC part number EK-VX11D-UG for the description of the available switches.

2.4 PROGRAM DESCRIPTION

This program contains four tests which exercise the SC750, SC780, SC12, SC21/V1 and SC31 disk controllers. These tests are further

grouped into five sections: Default, Media, Multi-Drive, Qualification, and Seek Timing. These section names must be specified with the Start command to invoke each test.

2.4.1 DEFAULT SECTION

This section issues each of the drive function instructions to ensure the drive(s) can support all the drive commands. After all the non-data transfer functions have been tested, the test issues a Write, Write Check and Read sequence command set to each of a group of disk addresses.

The next test performs Seek operations between cylinder 000 and cylinders: 001, 002, 004, 008, 016, 032, 064, 128, 256, and 512. Each Seek range is timed, and an average time is calculated and displayed on the console.

This section is run by default if no section name is specified in the Start command. The default section consists of the following tests:

        Test 1: Qualification
        Test 2: Seek Timing

2.4.2 QUALIFICATION SECTION

This section issues each of the drive function instructions to ensure the drive(s) can support all the drive commands. After all the non-data transfer functions have been tested, the test issues a Write, Write Check, and Read sequence command set to each of a group of disk addresses. This section is run by default if no section name is specified in the Start command. The qualification section consists of the following test:

        Test 1: Qualification

2.4.3 SEEK TIMING SECTION

This test performs Seek operations between cylinder 000 and cylinders: 001, 002, 004, 008, 016, 032, 064, 128, 256, and 512. Each Seek range is timed and an average time is calculated and displayed on the console. This section is run by default if no section name is specified in the Start command. The Seek Timing section consists of the following test:

        Test 2: Seek Timing

2.4.4 MEDIA SECTION

This section Writes and Write Checks every sector on the disk by using an entire track for each operation. Five different patterns are written onto each sector, to attempt verification of the usability of a given sector. This section is not run by default and must be explicitly requested as follows:

DS> STart/SECtion:MEdia

The media section consists of the following test:

Test 3:   Media Surface Verification

2.4.5 MULTI-DRIVE SECTION

This test tests up to eight drives concurrently by transferring random disk addresses. If fixed media disks are selected (RM80 or RP07), the operator is asked the following questions:

Fixed media devices (RM80 or RP07) are selected.
This test will destroy customer data if run on
the entire surface. If you do not want to destroy
the data, only FE cylinders will be used.
Do you want to use the entire pack ? [(NO), YES]

If the operator responds "NO", then only the FE cylinders are to be used on RM80 or RP07 type disks. If the response is "YES", then the operator is further asked:

Are you sure ? [(NO), YES]

If the response is "NO", the test is aborted. If the response is "YES" the test proceeds. This section does not run by default and must be explicitly requested as follows:

DS> STart/SECtion:MUlti

The Multi-Drive section consists of the following test:

Test 4:   Multi-Drive Functional Test

2.5 DISTRIBUTION

The Emulex disk reliability test is contained entirely on one floppy disk (Emulex part number VX9960501), or on one TU58 cassette (Emulex part number VX9960401), as appropriate to the system. The contents of this unit which apply to the SC750, SC780, SC12, SC21 or SC31 are defined as follows:

EDSKR.EXE   The SC750, SC780, SC12, SC21 and SC31 disk
             reliability program executable image.

The listings for the Emulex disk reliability program are identified as Emulex part number VX9960062. These listings contain the assembly list file (EDSKR.LIS) and the MAP file (EDSKR.MAP) of the disk reliability program.

NOTE

These listing files are proprietary information
that belong to Emulex. They are released only
with appropriate Software Source license.

3.1 GENERAL DESCRIPTION

This diagnostic test program is designed to aid in the acceptance
testing, installation checkout, and corrective maintenance of the
Emulex SC21/V1 and SC31 disk controllers.

3.2 REQUIREMENTS

For proper program installation, the following hardware and
software requirements should be observed.

3.2.1 HARDWARE REQUIREMENTS

The hardware necessary to properly run this diagnostic test
consists of the following components: a VAX-11 processor with 128KW
memory, a unibus adapter, a console device, an Emulex SC21 or SC31
disk controller and at least one supported disk drive. It is
assumed that the VAX CPU, memory, and Unibus Adapter are known to
be functioning properly.

3.2.2 SOFTWARE REQUIREMENTS

This program runs with the diagnostic supervisor ESSAA for the
VAX-11/780 processor, ECSAA for the VAX-11/750 processor, or ENSAA
for the VAX-11/730 processor, Version 6.0 or later.

3.3 LOADING PROCEDURES

The complete program loading requires three procedures.

3.3.1 LOADING PROCEDURES FOR THE VAX-11/780

To begin an Off-Line diagnostic session, you must first bootstrap
the Digital Equipment Corporation (DEC) Diagnostic Supervisor. To
accomplish this bootstrap, remove the floppy disk labeled "Local
Console" from the drive and insert the DEC-supplied DW780 channel
diagnostic floppy disk, then enter the following instruction:

        >>>^P
        >>>HALT
        >>>BOOT

This instruction loads the Diagnostic Supervisor into memory which
then announces itself with:

3-1

DIAGNOSTIC SUPERVISOR. ZZ-ESSAA-6.n-xxx
DS>

Remove the DEC DW780 channel diagnostic floppy disk and place the Emulex-supplied diagnostic floppy disk (Emulex part number VX9960501) in the drive. The diagnostic program must now be loaded and the SC21 or SC31 device must be ATTached and SELected. There are three ways in which this procedurecan be done: by using the Prompt mode, by using the Explicit (No Prompt) mode, or by using the Command File. Examples of each procedure are listed in Tables 3-1, 3-2, and 3-3. The underlined text indicates information which needs to be typed into the console by the user. It should follow the appropriate system prompt symbol which is a "DS>" or "?".

3.3.2 LOADING PROCEDURES FOR THE VAX-11/750

To begin an offline diagnostic session, you must first bootstrap the DEC Diagnostic Supervisor. To accomplish this procedure, remove the TU58 cassette labeled "Local Console" from the drive, insert the DEC-supplied RH750/DW750 channel diagnostic cassette, place the boot device select switch in the TU58 position, and press the RESET button. This procedure loads the Diagnostic Supervisor into memory which then announces itself with:

DIAGNOSTIC SUPERVISOR.   ZZ-ECSAA-6.n-xxx
DS>

Remove the DEC RH75-/DW750 diagnostic cassette and place the Emulex-supplied diagnostic cassette (Emulex part number VX9960401) in the drive. The diagnostic program must now be loaded and the SC21 or SC31 device must be ATTached and SELected. There are three ways in which this procedure can be done: by using the Prompt mode, by using the Explicit (No Prompt) mode, or by using the Command File. Examples of each procedure are listed in Tables 3-1, 3-2, and 3-3. The underlined text indicates information which needs to be typed into the console by the user. It should follow the appropriate system prompt symbol which is a "DS>" or "?".

3.3.3 LOADING PROCEDURES FOR THE VAX-11/730

To begin an Off-Line diagnostic session, you must first bootstrap the DEC Diagnostic Supervisor. To accomplish this procedure, remove the TU58 cassette labeled "Local Console" from the Internal drive (unit 1), and insert the DEC-supplied "Load Path" diagnostic cassette (#37). Insert the Emulex- supplied diagnostic cassette (Emulex part number VX9960401) in the External drive (unit 0), and enter the following instruction:

```
>>>I
>>>L/P/S:FE00 DD1:ENSAA.EXE
>>>S 10000
```

This instruction loads the Diagnostic Supervisor into memory which then announces itself with:

```
DIAGNOSTIC SUPERVISOR. ZZ-ENSAA-6.n-xxx
DS>
```

The diagnostic program must now be loaded and the SC21 or SC31 device must be ATTached and SELected. There are three ways in which this procedure can be done: by using the Prompt mode, by using the Explicit (No Prompt) mode, or by using the Command File. Examples of each are shown in tables 3-1, 3-2, and 3-3. The underlined text indicates information which needs to be typed into the console by the user. It should follow the appropriate system prompt symbol which is a "DS>" or "?".

Table 3-1. Prompt Mode

VAX-11/780	VAX-11/750	VAX-11/730
DS> LOAD ESC21	DS> LOAD ECS21	DS> LOAD ESC21
DS> ATTACH	DS> ATTACH	DS> ATTATCH
DEVICE TYPE ? DW780	DEVICE TYPE ? DW750	DEVICE TYPE ? DW730
DEVICE LINK ? SBI	DEVICE LINK ? CMI	DEVICE LINK ? HUB
DEVICE NAME ? DW0	DEVICE NAME ? DW0	DEVICE NAME ? DW0
TR ? 3	DS> ATTACH	DS> ATTACH
BR ? 4	DEVICE TYPE ? SC21	DEVICE TYPE ? SC21
DS> ATTACH	DEVICE LINK ? DW0	DEVICE LINK ? DW0
DEVICE TYPE ? SC21	DEVICE NAME ? UMA	DEVICE NAME ? UMA
DEVICE LINK ? DW0	CSR ? 776700	CSR ? 776700
DEVICE NAME ? UMA	DS> SELECT UMA	DS> SELECT UMA
CSR ? 776700		
DS> SELECT UMA		

Table 3-2. Explicit Mode

VAX-11/780	VAX-11/750
DS> LOAD ESC21	DS> LOAD ESC21
DS> ATT DW780 SBI DW0 3 4	DS> ATT DW750 CMI DW0
DS> ATT SC21 DW0 UMA 776700	DS> ATT SC21 DW0 UMA 776700
DS> SELECT UMA	DS> SELECT UMA

VAX-11/730

DS> LOAD ESC21
DS> ATT DW730 HUB DW0
DS> ATT SC21 DW0 UMA 776700
DS> SELECT UMA

Table 3-3. Command File

VAX-11/780	VAX-11/750
DS> @ESC21.780	DS> @ESC21.750
DS> LOAD ESC21	DS> LOAD ESC21
DS> ATT DW780 SBI DW0 3 4	DS> ATT DW750 CMI DW0
DS> ATT SC21 DW0 UMA 776700	DS> ATT SC21 DW0 UMA 776700
DS> SELECT UMA	DS> SELECT UMA
DS> SET TRACE	DS> SET TRACE

VAX-11/730

DS> @ESC21.730
DS> LOAD ESC21
DS> ATT DW730 HUB DW0
DS> ATT SC21 DW0 UMA 776700
DS> SELECT UMA

Once the Unit Under Test (UUT) has been SELECTed, the diagnostic program must be started as follows:

DS> STart[/(switches)]

See the VAX Diagnostic User's Guide, DEC part number EK-VX11D-UG, for the description of the available switches.

3.4 PROGRAM DESCRIPTION

This program contains 21 tests which check the SC21/V1 or SC31 disk controller. These tests are further divided into two sections: Default and Configuration. When the program is first started it responds with:

..program: Emulex SC21/SC31 Disk Controller Diagnostic, Rev n
Testing: _UMA

3.4.1 DEFAULT SECTION

This section checks the basic SC21/V1 or SC31 controller functions such as register read/write, correct error detection, controller initialization, maintenance mode features, disk addressability, and bus address checks. This section is run by default if no section name is specified in the Start command. The Default Section consists of the following tests:

          Test 1:   Address all registers
          Test 2:   CS1 register (all 1 & 0)
          Test 3:   Function bits (moving 1 & 0)
          Test 4:   WC register (all 1 & 0)
          Test 5:   WC register (moving 1 & 0)
          Test 6:   BA register (all 1 & 0)
          Test 7:   BA register (moving 1 & 0)
          Test 8:   MR1 bits can be set and cleared
          Test 9:   DC register (all 1 & 0)
          Test 10:   DC register (moving 1 & 0)
          Test 11:   DA register (all 1 & 0)
          Test 12:   DA register (moving 1 & 0)
          Test 13:   Invalid commands give error
          Test 14:   Invalid DB access gives error
          Test 15:   SC bit set causes i
          Test 16:   IE & RDY set cause interrupt
          Test 17:   Check that pack ack sets VV
          Test 18:   Test IVC bit
          Test 19:   Increment bus address register
          Test 20:   Test BAI bit

3.4.2 CONFIGURATION SECTION

This section accesses the SC21 or SC31 DT, SN, and HR registers to obtain the controller configuration. The information obtained is output in the following format:

```
        Emulex SC21/SC31 Disk Controller CSR [177777]
        vector [377] is configured as an [Rtnn]
        port number [ff]
        firmware rev [ff]
        switches [377]
        maximum cylinder address 999.
        maximum track address 99.
        maximum sector address 99.

        where t = M for RM02/RM03/RM05/RM80
                  P for RP06
```

This section should be run whenever there is any doubt as to the
SC21/V1 or SC31 controller configuration or when inconsistant
results are obtained in any other portion of the diagnostic. This
section is not run by default and must be explicitly requested as
follows:

        DS> STart/SECtion:CONfiguration

The configuration section consists of the following test:

        TEST 21 Get the controller configuration

3.5 DISTRIBUTION

The SC21/SC31 diagnostics are contained entirely on one floppy
disk (Emulex part number VX9960501) or on one TU58 cassette
(Emulex part number VX9960401), as appropriate to the system. The
contents of this unit, which apply to the SC21/V1 or SC31 disk
controller, are defined as follows:

ESC21.780	Command file to load the SC21/SC31 diagnostic and attach the controller to the VAX-11/780 system. This command file is invoked by typing "@ESC21.780" at theDiagnostic Supervisor (DS>) prompt symbol.
ESC21.750	Command file to load the SC21/SC31 diagnostic and attach the controller to the VAX-11/750 system. This command file is invoked by typing "@ESC21.750" at the DS> prompt symbol.
ESC21.730	Command file to load the SC21/SC31 diagnostic and attach the controller to the VAX-11/730 system. This command file is invoked by typing "@ESC21.730" at the DS> prompt symbol.
ESC21.EXE	The SC21/SC31 diagnostic program executable image.

ESC21.HLP   The SC21/SC31 help file to provide the user
                 with additional information on loading and
                 running the diagnostics and its options. This
                 file is obtained by typing "HELP ESC21
                 [subtopic]" at the DS> prompt symbol once the
                 diagnostic medium is mounted in the appropriate
                 drive.

The listings for the Emulex SC21/SC31 diagnostic program are
identified as Emulex part number VX9960060. These listings
contain the assembly list file (ESC21.LIS) and the link map file
(ESC21.MAP) of the SC21/SC31 diagnostic.

NOTE

      The listing files are proprietary information
      that belong to Emulex. They are released only
      with appropriate Software Source license.

3.6 MAINTENANCE HISTORY

Version 1.0   21 August 1981
     Diagnostic supervisor 6.0
          Initial release
Version 1.1   5 October 1981
     Diagnostic supervisor 6.2
          Change register names to conform to manual. Fix
          bug in format section that cleared register mask.
          Change format routine to be interrupt driven to
          help speed things up a bit.
Version 1.2   30 November 1981
     Diagnostic supervisor 6.2
          Set "FMT16" in RMOF to insure 32. sector mode. Change
          "RM_DO" to include unit number after error reset. Omit
          RMDB from test 1 initialized value check.
Version 1.3   1 June 1982
     Diagnostic supervisor 6.5
          Removed the maintenance function tests because of timing
          problems seen on the 11/780. Since these tests only
          check the maintenance mode firmware and not actual drive
          functionality, little or no diagnostic capability is
          lost by the removal of these tests. Added time stamps
          at start and completion of both firmware format and
          surface analysis functions. Changed Invalid command
          test and IVC bit test to wait for interrupt with
          embedded timer enabled instead of waiting for RDY bit to
          avoid possible infinite loop situation.
Version 1.4   29 June 1982
     Diagnostic supervisor 6.5
          Removed the last maintenance mode to do away with a
          problem in the IFL test seen only on units other than
          zero.

Version 1.5   28 July 1982
     Diagnostic supervisor 6.5
          Removed the format section since this is now done
          through the Emulex disk formatting program, EDSKF.

4.1 GENERAL DESCRIPTION

This diagnostic test program is designed to aid in the acceptance testing, installation checkout, and corrective maintenance of the Emulex TC11 tape controller.

4.2 REQUIREMENTS

For proper program installation, the following hardware and software requirements should be observed.

4.2.1 HARDWARE REQUIREMENTS

The hardware necessary to properly run this diagnostic test consists of the following components: a VAX-11 processor with 128KW memory, a unibus adapter, a console device, an Emulex TC11 tape controller and at least one TC11-supported tape drive. It is assumed that the VAX CPU, memory and Unibus Adapter are known to be functioning properly.

4.2.2 SOFTWARE REQUIREMENTS

This program runs with the diagnostic supervisor ESSAA for the VAX-11/780 processor, ECSAA for the VAX-11/750 processor, or ENSAA for the VAX-11/730 processor, Version 6.0 or later.

4.3 LOADING PROCEDURES

The complete program loading requires three procedures.

4.3.1 LOADING PROCEDURES FOR THE VAX-11/780

To begin an Off-Line diagnostic session you must first bootstrap the DEC Diagnostic Supervisor. To accomplish this bootstrap, remove the floppy disk labeled "Local Console" from the drive and insert the DW780 channel diagnostic floppy disk, supplied by Digital Equipment Corporation (DEC), then enter the following instruction:

        >>>^P
        >>>HALT
        >>>BOOT

This instruction loads the Diagnostic Supervisor into memory which then announces itself with:

        DIAGNOSTIC SUPERVISOR. ZZ-ESSAA-6.n-xxx
        DS>

Remove the DEC DW780 channel diagnostic floppy disk and place the Emulex-supplied diagnostic floppy disk (Emulex part number VX9960501) in the drive. The diagnostic program must now be loaded and the TC11 device must be ATTached and SELected. There are three ways in which this procedure can be done: by using the Prompt mode, by using the Explicit (No Prompt) mode, or by using the Command File. Examples of each procedure are listed in Tables 4-1, 4-2, and 4-3. The underlined text indicates information which needs to be typed into the console by the user. It should follow the appropriate system prompt symbol which is a "DS>" or "?".

4.3.2 LOADING PROCEDURES FOR THE VAX-11/750

To begin an Off-Line diagnostic session, you must first bootstrap the DEC Diagnostic Supervisor. To accomplish this bootstrap, remove the TU58 cassette labeled "Local Console" from the drive, insert the DEC-supplied RH750/DW750 channel diagnostic cassette, place the bootstrap device select switch in the TU58 position, and press the RESET button. This procedure loads the Diagnostic Supervisor into memory which then announces itself with:

```
DIAGNOSTIC SUPERVISOR. ZZ-ECSAA-6.n-xxx
DS>
```

Remove the DEC RH750/DW750 channel diagnostic cassette and place the Emulex-supplied diagnostic cassette (Emulex part number VX9960401) in the drive. The diagnostic program must now be loaded and the TC11 device must be ATTached and SELected. There are three ways in which this procedure can be done: by using the Prompt mode, by using the Explicit (No Prompt) mode, or by using the Command File. Examples of each procedure are listed in Tables 4-1, 4-2, and 4-3. The underlined text indicates information which needs to be typed into the console by the user. It should follow the appropriate system prompt symbol which is a "DS>" or "?".

4.3.3 LOADING PROCEDURES FOR THE VAX-11/730

To begin an Off-Line diagnostic session, you must first bootstrap the DEC Diagnostic Supervisor. To accomplish this procedure, remove the TU58 cassette labeled "Local Console" from the Internal drive (unit 1) and insert the DEC-supplied "Load Path" diagnostic cassette (#37). Insert the Emulex diagnostic cassette (Emulex part number VX9960401) in the External drive (unit 0), and enter the following instruction:

```
>>>I
>>>L/P/S:FE00 DD1:ENSAA.EXE
>>>S 10000
```

This instruction loads the Diagnostic Supervisor into memory which then announces itself with:

```
DIAGNOSTIC SUPERVISOR. ZZ-ENSAA-6.n-xxx
DS>
```

The diagnostic program must now be loaded and the TC11 device must
be ATTached and SELected. There are three ways in which this
procedure can be done: by using the Prompt mode, by using the
Explicit (No Prompt) mode, or by using the Command File. Examples
of each procedure are listed in Tables 4-1, 4-2, and 4-3. The
underlined text indicates information which needs to be typed into
the console by the user. It should follow the appropriate system
prompt symbol which is a "DS>" or "?".

Table 4-1. Prompt Mode

| VAX-11/780 | VAX-11/750 | VAX-11/730 |

```
DS> LOAD ETC11          DS> LOAD ETC11          DS> LOAD ETC11
DS> ATTACH              DS> ATTACH              DS> ATTACH
DEVICE TYPE ? DW780     DEVICE TYPE ? DW750     DEVICE TYPE ? DW730
DEVICE LINK ? SBI       DEVICE LINK ? CMI       DEVICE LINK ? HUB
DEVICE NAME ? DW0       DEVICE NAME ? DW0       DEVICE NAME ? DW0
TR ? 3                  DS> ATTACH              DS> ATTACH
BR ? 4                  DEVICE TYPE ? TC11      DEVICE TYPE ? TC11
DS> ATTACH              DEVICE LINK ? DW0       DEVICE LINK ? DW0
DEVICE TYPE ? TC11      DEVICE NAME ? TCA       DEVICE NAME ?  TCA
DEVICE LINK ? DW0       CSR ? 772520            CSR ? 772520
DEVICE NAME ?  TCA      DS> SELECT TCA          DS> SELECT TCA
CSR ? 772520
DS> SELECT TCA
```

Table 4-2. Explicit Mode

| VAX-11/780 | VAX-11/750 |

```
DS> LOAD ETC11              DS> LOAD ETC11
DS> ATT DW780 SBI DW0 3 4   DS> ATT DW750 CMI DW0
DS> ATT TC11 DW0 TCA 772520 DS> ATT TC11 DW0 TCA 772520
DS> SEL TCA                 DS> SEL TCA
```

VAX-11/730

```
DS> LOAD ETC11
DS> ATT DW730 HUB DW0
DS> ATT TC11 DW0 TCA 772520
DS> SEL TCA
```

Table 4-3. Command File

VAX-11/780	VAX-11/750
DS> @ETC11.780	DS> @ETC11.750
DS> LOAD ESC21	DS> LOAD ESC21
DS> ATT DW780 SBI DW0 3 4	DS> ATT DW750 CMI DW0
DS> ATT TC11 DW0 TCA 772520	DS> ATT TC11 DW0 TCA 772520
DS> SELECT TCA	DS> SELECT TCA

VAX-11/730

DS> @ETC11.730
DS> LOAD ETC11
DS> ATT DW730 HUB DW0
DS> ATT TC11 DW0 TCA 772520
DS> SEL TCA

Once the Unit Under Test (UUT) has been SELECTed, the diagnostic program must be started as follows:

DS> STart[/(switches)]

See the VAX Diagnostic User's Guide, DEC part number EK-VX11D-UG, for the description of the available switches.

4.4 PROGRAM DESCRIPTION

This program contains 27 tests which check the TC11 tape controller. These tests are further divided into five sections: Default, Configuration, phase encoded (PE), Tape, and Manual. When the program is first started, it responds with:

..program: Emulex TC11 Tape Controller Diagnostic, Rev n.n
Testing: _TC
  Enter drive number to test [(0), 0-3] :

4.4.1 DEFAULT SECTION

This section checks the basic TC11 controller functions such as register read/write, correct error detection, controller initialization, and bus address checks. This section is run by default if no section name is specified in the Start command. This section may be run without any tape loaded or without any drive on line, since no tape motion is generated by any of these tests. The default section consists of the following tests:

```
Test   1:      Address all registers
Test   2:      MTBRC register (all 1 & 0)
Test   3:      MTBRC register (moving 1 & 0)
Test   4:      MTCMA register (all 1 & 0)
Test   5:      MTCMA register (moving 1 & 0)
Test   6:      MTD register (all 1 & 0)
Test   7:      MTD register (moving 1 & 0)
Test   8:      Check unit select bits
Test   9:      Check IE
Test   10:     Check A16 & A17 increment
Test   11:     Check byte loading of command register
Test   12:     Check density bits
```

4.4.2 CONFIGURATION SECTION

This section is used to display the Emulex TC11 controller configuration. The information is displayed in the following format:

```
Emulex TC11 Tape Controller CSR [177777]
vector [377] is 800(NRZI)[/1600(PE)].
Unit 0 responded [NOT] ready, [NOT] at BOT, [NOT] write locked
Unit 1 responded [NOT] ready, [NOT] at BOT, [NOT] write locked
Unit 2 responded [NOT] ready, [NOT] at BOT, [NOT] write locked
Unit 3 responded [NOT] ready, [NOT] at BOT, [NOT] write locked
```

This section should be run at installation time or any time inconsistent results are obtained in any other portion of the diagnostic. This section is not run by default and must be explicitly requested as follows:

DS> STart/SECtion:CONfiguration

The configuration section consists of the following test:

Test 13: Get controller configuration

4.4.3 PE SECTION

This section is used to execute the built-in diagnostics of the PE printed circuit board assembly (PCBA). This self-test consists of a simulated phase-encoded record that contains a preamble, 20 identical data characters, and a shortened postamble. This section can not be run if the PE option is not installed. The PE section consists of the following test:

Test 14: Execute internal PE test

This section is not run by default and must be explicitly requested as follows:

DS> STart/SECtion:PE

4.4.4 TAPE SECTION

This section is used by the operator to execute tape motion on the drive to check tape transport operation. The tests in this section check for Beginning of Tape (BOT), End of Tape (EOT), Write and Read functions as well as Rewind, Space Forward, and Space Reverse functions. The use of this section requires a scratch tape (recommended 600 ft) be mounted in the drive, and that the drive be in the On-Line mode.

NOTE

This section tests tape transport motion only, and is not intended to check data reliability. Once started, this section should cycle through to completion. Some of the tests assume the previous tests have been done and results of explicitly running these tests out of order are not specified.

This section is not run by default and must be explicitly requested as follows:

DS> <u>STart/SECtion:TApe</u>

The tape section consists of the followings tests:

        Test   15:   Check for BOT
        Test   16:   Check Rewind function
        Test   17:   Check Write function
        Test   18:   Check Read function
        Test   19:   Check Write EOF function
        Test   20:   Check Space Forward/Reverse function
        Test   21:   Check Rewind & Backspace ignored at BOT
        Test   22:   Check that NXM bit can set
        Test   23:   Check Rewind causes two interrupts
        Test   24:   Data transfer test
        Test   25:   Tape positioning test

4.4.5 MANUAL SECTION

The manual section contains two tests which check for EOT and for proper operation of the Off-Line function. This section contains the following tests:

        Test 26:   Check for EOT
        Test 27:   Check off-line function

This section is not run by default and must be explicitly requested as follows:

DS> <u>STart/SECtion:MANual</u>

4.5 ERROR AND INFORMATION MESSAGES

The TC11 diagnostic may output a number of different messages for information purposes or for announcing error conditions that are detected during execution of the diagnostics. These messages can be any one of the four following types:

1) Error messages output to indicate something did not occur as expected but testing is to continue.
2) System fatal errors which indicate something catastrophic has occured and continued testing is pointless. The occurance of one of these errors terminates the diagnostic.
3) Information messages such as reporting the configuration of the controller or listing the function being tested in the current test.
4) Operator interaction requested such as entry of the unit to test by the operator.

4.6 DISTRIBUTION

The TC11 diagnostics are contained entirely on one floppy disk (Emulex part number VX9960501) or on one TU58 cassette (Emulex part number VX9960401), as appropriate to the system. The contents of this unit which apply to the TC11 are defined as follows:

ETC11.780   Command file to load the TC11 diagnostic and attach the TC11 controller to the VAX-11/780 system. This command file is invoked by typing "@ETC11.780" at the diagnostic supervisor (DS>) prompt symbol..

ETC11.750   Command file to load the TC11 diagnostic and attach the TC11 controller to the VAX-11/750 system. This command file is invoked by typing "@ETC11.750" at the DS> prompt symbol..

ETC11.730   Command file to load the TC11 diagnostic and attach the TC11 controller to the VAX-11/730 system. This command file is invoked by typing "@ETC11.730" at the DS> prompt symbol.

ETC11.EXE   The TC11 diagnostic program executable image.

ETC11.HLP   The TC11 help file to provide the user with additional information on loading and running the diagnostics and its options. This file is obtained by typing "HELP ETC11 [subtopic]" at the DS> prompt symbol once the diagnostic medium is mounted in the appropriate drive.

The listings for the Emulex TC11 diagnostic program are identified as Emulex part number VX9960040. These listings contain the assembly list file (ETC11.LIS) and the link map file (ETC11.MAP) of the TC11 Diagnostic.

NOTE

The listing files are proprietary information that belong to Emulex. They are released only with appropriate Software Source license.

4.7 MAINTENANCE HISTORY

Version 1.0   4 June 1982
    Diagnostic Supervisor 6.0
        Initial release

Version 1.1   17 Dec 1982
    Diagnostic Supervisor 6.0
        Added optional address support for new PCBA.

5.1 GENERAL DESCRIPTION

This diagnostic test program is designed to aid in the acceptance testing, installation checkout, and corrective maintenance of the Emulex CS11 Communications Multiplexer with one to four CP11 distribution panels.

5.2 REQUIREMENTS

For proper program installation, the following hardware and software requirements should be observed.

5.2.1 HARDWARE REQUIREMENTS

The hardware necessary to properly run this diagnostic test consists of the following components: a VAX-11 processor with 128KW memory, a Unibus adaptor, a console device, an Emulex CS11 Communications Multiplexer, one to four CP11 distribution panels, one to eight adaptor panels, and one to 64 Digital Equipment Corporation (DEC) type H315 wrap-around test connectors. It is assummed that the VAX CPU, memory, and Unibus adaptor are known to be functioning properly.

5.2.2 SOFTWARE REQUIREMENTS

This program runs with the diagnostic supervisor ESSAA for the VAX-11/780 processor, ECSAA for the VAX-11/750 processor, or ENSAA for the VAX-11/730 processor, Version 6.0 or later.

5.3 LOADING PROCEDURES

The complete program loading procedure requires three operations.

5.3.1 LOADING PROCEDURES FOR THE VAX-11/780

To begin an Off-Line diagnostic session, you must first bootstrap the DEC Diagnostic Supervisor. To accomplish this procedure, remove the floppy disk labeled "Local Console" from the drive and insert the DEC-supplied DW780 channel diagnostic floppy disk, then enter the following instruction:

```
>>>^P
>>>HALT
>>>BOOT
```

This instruction loads the Diagnostic Supervisor into memory which then announces itself with:

```
DIAGNOSTIC SUPERVISOR. ZZ-ESSAA-6.n-xxx
DS>
```

Remove the DEC DW780 channel diagnostic floppy disk and place the Emulex-supplied diagnostic floppy disk (Emulex part number VX9960501) in the drive. The diagnostic program must now be loaded and the CS11/CS21 device must be ATTached and SELected. There are three ways in which this procedure can be done: by using the Prompt mode, by using the Explicit (No Prompt) mode, or by using the Command File. Examples of each procedure are listed in Tables 5-1, 5-2, and 5-3. The underlined text indicates information which needs to be typed into the console by the user. It should follow the appropriate system prompt symbol which is a "DS>" or "?".

5.3.2 LOADING PROCEDURES FOR THE VAX-11/750

To begin an Off-Line diagnostic session, you must first bootstrap the DEC Diagnostic Supervisor. To accomplish this procedure, remove the TU58 cassette labeled "Local Console" from the drive, insert the DEC-supplied RH750/DW750 channel diagnostic cassette, place the bootstrap device select switch in the TU58 position, and press the RESET button. This procedure loads the Diagnostic Supervisor into memory which then announces itself with:

```
DIAGNOSTIC SUPERVISOR. ZZ-ECSAA-6.n-xxx
DS>
```

Remove the DEC RH750/DW750 channel diagnostic cassette and place the Emulex-supplied diagnostic cassette (Emulex part number VX9960401) in the drive. The diagnostic program must now be loaded and the CS11/CS21 device must be ATTached and SELected. There are three ways in which this procedure can be done: by using the Prompt mode, by using the Explicit (No Prompt) mode, or by using the Command File. Examples of each procedure are listed in Tables 5-1, 5-2, and 5-3. The underlined text indicates information which needs to be typed into the console by the user. It should follow the appropriate system prompt symbol which is a "DS>" or "?".

5.3.3 LOADING PROCEDURES FOR THE VAX-11/730

To begin an Off-Line diagnostic session, you must first bootstrap the DEC Diagnostic Supervisor. To accomplish this procedure, remove the TU58 cassette labeled "Local Console" from the Internal drive (unit 1), and insert the DEC-supplied "Load Path" diagnostic cassette (#37), then insert the Emulex diagnostic cassette (Emulex part number VX9960401) in the External drive (unit 0), and enter the following instruction:

```
>>>I
>>>L/P/S:FE00 DD1:ENSAA.EXE
>>>S 10000
```

This instruction loads the Diagnostic Supervisor into memory which then announces itself with:

DIAGNOSTIC SUPERVISOR. ZZ-ENSAA-6.n-xxx
DS>

The diagnostic program must now be loaded and the CS11/CS21 device must be ATTached and SELected. There are three ways in which this procedure can be done: by using the Prompt mode, by using the Explicit (No Prompt) mode, or by using the Command File. Examples of each procedure are listed in Tables 5-1, 5-2, and 5-3. The underlined text indicates information which needs to be typed into the console by the user. It should follow the appropriate system prompt symbol which is a "DS>" or "?".

Table 5-1. Prompt Mode

VAX-11/780	VAX-11/750	VAX-11/730
DS> LOAD ECS11	DS> LOAD ECS11	DS> LOAD ECS11
DS> ATTACH	DS> ATTACH	DS> ATTATCH
DEVICE TYPE ? DW780	DEVICE TYPE ? DW750	DEVICE TYPE ? DW730
DEVICE LINK ? SBI	DEVICE LINK ? CMI	DEVICE LINK ? HUB
DEVICE NAME ? DW0	DEVICE NAME ? DW0	DEVICE NAME ? DW0
TR ? 3	DS> ATTACH	DS> ATTATCH
BR ? 4	DEVICE TYPE ? DH	DEVICE TYPE ? DH
DS> ATTACH	DEVICE LINK ? DW0	DEVICE LINK ? DW0
DEVICE TYPE ? DH	DEVICE NAME ? DHA	DEVICE NAME ? DHA
DEVICE LINK ? DW0	CSR ? 760020	CSR ? 760020
DEVICE NAME ? DHA	BR ? 5	BR ? 5
CSR ? 760020	DS> SELECT DHA	DS> SELECT DHA
BR ? 5	DS> ATTACH	DS> ATTACH
DS> SELECT DHA	DEVICE TYPE ? DM	DEVICE TYPE ? DM
DS> ATTACH	DEVICE LINK ? DW0	DEVICE LINK ? DW0
DEVICE TYPE ? DM	DEVICE NAME ? DMA	DEVICE NAME ? DMA
DEVICE LINK ? DW0	CSR ? 770500	CSR ? 770500
DEVICE NAME ? DMA	BR ? 4	BR ? 4
CSR ? 770500	DS> SELECT DMA	DS> SELECT DMA
BR ? 4	DS> SET TRACE	DS> SET TRACE
DS> SELECT DMA		
DS> SET TRACE		

NOTE

Continue the above steps, changing the CSR and device name to DHB, DHC,   etc., or DMB, DMC, etc. for each additional CP11 panel to be tested. Each CP11 panel is described as an individual logical unit for testing purposes.

Table 5-2. Explicit Mode

VAX-11/780	VAX-11/750

```
DS> LOAD ECS11              DS> LOAD ECS11
DS> ATT DW780 SBI DW0 3 4   DS> ATT DW750 CMI DW0
DS> ATT DH DW0 DHA 760020 5 DS> ATT DH DW0 DHA 760020 5
DS> ATT DM DW0 DMA 770500 4 DS> ATT DM DW0 DMA 770500 4
DS> ATT DH DW0 DHB 760040 5 DS> ATT DH DW0 DHB 760040 5
DS> ATT DM DW0 DMB 770520 4 DS> ATT DM DW0 DMB 770520 4
DS> ATT DH DW0 DHC 760060 5 DS> ATT DH DW0 DHC 760060 5
DS> ATT DM DW0 DMC 770540 4 DS> ATT DM DW0 DMC 770540 4
DS> ATT DH DW0 DHD 760100 5 DS> ATT DH DW0 DHD 760100 5
DS> ATT DM DW0 DMD 770560 4 DS> ATT DM DW0 DMD 770560 4
DS> SEL DHA                 DS> SEL DHA
DS> SEL DMA                 DS> SEL DMA
DS> SEL DHB                 DS> SEL DHB
DS> SEL DMB                 DS> SEL DMB
DS> SEL DHC                 DS> SEL DHC
DS> SEL DMC                 DS> SEL DMC
DS> SEL DHD                 DS> SEL DHD
DS> SEL DMD                 DS> SEL DMD
DS> SET TRACE               DS> SET TRACE
```

VAX-11/730

```
DS> LOAD ECS11
DS> ATT DW730 HUB DW0
DS> ATT DH DW0 DHA 760020 5
DS> ATT DM DW0 DMA 770500 4
DS> ATT DH DW0 DHB 760040 5
DS> ATT DM DW0 DMB 770520 4
DS> ATT DH DW0 DHC 760060 5
DS> ATT DM DW0 DMC 770540 4
DS> ATT DH DW0 DHD 760100 5
DS> ATT DM DW0 DMD 770560 4
DS> SEL DHA
DS> SEL DMA
DS> SEL DHB
DS> SEL DMB
DS> SEL DHC
DS> SEL DMC
DS> SEL DHD
DS> SEL DMD
DS> SET TRACE
```

Table 5-3. Command File

VAX-11/780	VAX-11/750

```
DS> @ECS11.780              DS> @ECS11.750
DS> ATT DW780 SBI DW0 3 4   DS> ATT DW750 CMI DW0
DS> ATT DH DW0 DHA 760020 5 DS> ATT DH DW0 DHA 760020 5
DS> ATT DM DW0 DMA 770500 4 DS> ATT DM DW0 DMA 770500 4
DS> ATT DH DW0 DHB 760040 5 DS> ATT DH DW0 DHB 760040 5
DS> ATT DM DW0 DMB 770520 4 DS> ATT DM DW0 DMB 770520 4
DS> ATT DH DW0 DHC 760060 5 DS> ATT DH DW0 DHC 760060 5
DS> ATT DM DW0 DMC 770540 4 DS> ATT DM DW0 DMC 770540 4
DS> ATT DH DW0 DHD 760100 5 DS> ATT DH DW0 DHD 760100 5
DS> ATT DM DW0 DMD 770560 4 DS> ATT DM DW0 DMD 770560 4
DS> SEL DHA                 DS> SEL DHA
DS> SEL DMA                 DS> SEL DMA
DS> SEL DHB                 DS> SEL DHB
DS> SEL DMB                 DS> SEL DMB
DS> SEL DHC                 DS> SEL DHC
DS> SEL DMC                 DS> SEL DMC
DS> SEL DHD                 DS> SEL DHD
DS> SEL DMD                 DS> SEL DMD
DS> SET TRACE               DS> SET TRACE
```

VAX-11/730

```
DS> @ECS11.730
DS> ATT DW730 HUB DW0
DS> ATT DH DW0 DHA 760020 5
DS> ATT DM DW0 DMA 770500 4
DS> ATT DH DW0 DHB 760040 5
DS> ATT DM DW0 DMB 770520 4
DS> ATT DH DW0 DHC 760060 5
DS> ATT DM DW0 DMC 770540 4
DS> ATT DH DW0 DHD 760100 5
DS> ATT DM DW0 DMD 770560 4
DS> SEL DHA
DS> SEL DMA
DS> SEL DHB
DS> SEL DMB
DS> SEL DHC
DS> SEL DMC
DS> SEL DHD
DS> SEL DMD
DS> SET TRACE
```

NOTE

The Command File is set up to ATTACH four
CP11 panels, with base addresses of 760020
and 770500 for the first DH and DM devices,
respectively. If the CS11 is configured to
access other addresses, use either Explicit
mode or Prompt mode to ATTACH and run the
diagnostic, or edit the Command File to the
desired address.

Once the UUT has been ATTACHed and SELECTed, the diagnostic must be
started as follows:

DS> ST(art)[/(SWITCHES)]

See the VAX Diagnostic User's Guide for the description of the
available switches.

5.4 PROGRAM DESCRIPTION

This program contains 29 tests which check the CS11 Communications
Multiplexer controller and the integral DM11 modem control unit.
These tests are further divided into four sections: configuration,
default, silo and modem. When the program is first started it
responds with:

```
..program:  Emulex CS11/CS21 Multiplexer Diagnostic, Rev N.N
Testing: _DHA _DMA (_DHB, _DMB, _DHC, _DMC, _DHD, _DMD)
Lines currently selected for test:
   Panel   Line       Line
   Number  Mask       Number(s)
     0     FFFF(X)    15,14,13,12,11,10,9,8,7,6,5,4,3,2,1,0
     1     0000(X)
     2     0000(X)
     3     0000(X)
Change selected lines [(no), yes]

Local loopback enabled [(yes), no]
```

In this configuration, the program is set up
to test only one panel. The default is to
check all 16 lines on the one panel, but this
check can be changed by answering "Y" to the
"Change selected lines" question. The line
selection mask is specified in hexadecimal
format and the bits in this mask are defined
from left-to-right in descending order, while
lines on the CP11 distribution panel are
defined from left-to-right in ascending order.
Each line which is in the line selection mask,
and which is selected for testing, requires a
DEC-type H315 wrap-around test connector,
unless the local loopback is selected.

5.4.1 DEFAULT SECTION

This section checks the basic CS11 controller functions such as
register read/write, correct error detection, maintenance mode
features, controller initialization, and bus address checks. This
section is run by default if no section name is specified in the
Start command. The default section consists of the following
tests:

```
Test    1:   ADDRESS ALL DH REGISTERS
Test    2:   ADDRESS ALL DM REGISTERS
Tset    3:   LPR REGISTER (MOVING 1 & 0)
Test    4:   CAR REGISTER (ALL 1 & 0)
Test    5:   CAR REGISTER MOVING 1 & 0)
Test    6:   CAR MEMORY ADDRESSING TEST
Test    7:   BCR REGISTER (ALL 1 & 0)
Test    8:   BCR REGISTER (MOVING 1 & 0)
Test    9:   BCR MEMORY ADDRESSING TEST
Test   10:   BKR REGISTER (MOVING 1 & 0)
Test   11:   CHECK EA BITS
Test   12:   TRANSMITTER TIMING TEST
Test   13:   RECEIVER TIMING TEST
Test   14:   BASIC DATA TEST
Test   15:   SINGLE LINE DATA TEST
Test   16:   BASIC PARITY LOGIC TEST
Test   17:   SINGLE LINE AUTO ECHO TEST
Test   18:   BREAK BIT TEST
Test   19:   CHECK THAT OVERRUN SETS
Test   20:   MULTI-LINE AUTO ECHO TEST
Test   21:   AUTO ECHO TEST, ALL SELECTED LINES
```

5.4.2 SILO SECTION

This section tests the silo status register for correct operation by filling the silo with test characters or trying to remove a specified number of characters from the filled silo.

NOTE

This section cannot be run with the Extended Silo feature enabled (bit 01 of SW1) because the silo maintenance bit is included as part of the silo fill level in the Extended Silo mode.

This section is not run by default and must be explicitly requested as follows:

ST(art)/SEC(tion):SILO

The silo section consists of the following tests:

Test 22:   CHECK THAT SSR COUNTS UP
Test 23:   CHECK THAT SSR COUNTS DOWN
Test 24:   TESTS SILO ALARM LEVEL

5.4.3 MODEM SECTION

This section checks the modem signals. It is not run by default and must be explicitly requested as follows:

ST(art)/SEC(tion):MODEM

The modem section consists of the following tests:

Test 25:   CHECK LINE ENABLE BIT
Test 26:   CHECK CLEAR TO SEND AND CARRIER
Test 27:   CHECK RING
Test 28:   CHECK SECONDARY RECEIVE

5.4.4 CONFIGURATION SECTION

This section should be run as part of the controller installation as well as any time that the CS11/21 diagnostics are run. This test helps to determine the controller configuration. The following information is provided by this test:

Test 29: DISPLAY CONTROLLER CONFIGURATION

Emulex CS11/21 Communications Multiplexer has the extended silo enabled [disabled]

PANEL	LUN	DH CSR	DH VECTOR	DM CSR	DM VECTOR
0	0	777777	777(R)		
0	0	777777	777(T)		
0	1			777777	777
1	2	777777	777(R)		
1	2	777777	777(T)		
1	3			777777	777
2	4	777777	777(R)		
2	4	777777	777(T)		
2	5			777777	777
3	6	777777	777(R)		
3	6	777777	777(T)		
3	7			777777	777

This section is not run by default and must be explicitly requested as follows:

ST(art)/SEC(tion):CON(figuration)

5.5 DISTRIBUTION

The CS11/CS21 diagnostics are contained entirely on one floppy disk (Emulex part number VX9960501), or on one cassette (Emulex part number VX9960401), as appropriate to the system. The contents of this unit which apply to the CS11 or CS21 are defined as follows:

ECS11.780   Command File to load the CS11/CS21
                   diagnostic and attach the CS11 controller
                   to the VAX-11/780 system. This Command
                   File is invoked by typing "@ECS11.780"
                   after the diagnostic supervisor (DS>)
                   prompt symbol.

ECS11.730   Command File to load the CS11/CS21
                   diagnostic and attach the CS11 controller
                   to the VAX-11/730 system. This Command
                   File is invoked by typing "@ECS11.730"
                   after the DS> prompt symbol.

ECS21.780   Command File to load the CS11/CS21
                 diagnostic and attach the CS21 controller
                 to the VAX-11/780 system. This Command
                 File is invoked by typing "@ECS21.780"
                 after the DS> prompt symbol.

ECS21.750   Command File to load the CS11/CS21
                 diagnostic and attach the CS21 controller
                 to the VAX-11/750 system. This Command
                 File is invoked by typing "@ECS21.750"
                 after the DS> prompt symbol.

ECS21.730   Command File to load the CS11/CS21
                 diagnostic and attach the CS21 controller
                 to the VAX-11/730 system. This Command
                 File is invoked by typing "@ECS21.730"
                 after the DS> prompt symbol.

ECS11.EXE   The   CS11/CS21   diagnostic   progam
                 executable image.

ECS11.HLP   The CS11/CS21 HELP file to provide the
                 user with additional information on
                 loading and running the diagnostic and
                 it's options. This file is obtained by
                 typing "HELP ECS11 [subtopic]" at the DS>
                 prompt symbol once the CS11 diagnostic
                 medium is mounted in the appropriate
                 drive.

The listings for the Emulex CS11/CS21 diagnostic program are
identified as Emulex part number VX9960020. These listings contain
the assembly file (ECS11.LIS) and the link map file (ECS11.MAP) of
the CS11/CS21 diagnostic.

NOTE

The listing files are proprietary information
that belong to Emulex. They are released only
with appropriate Software Source license.

5.6 MAINTENANCE HISTORY

Version 1.0   4 December 1981
     Diagnostic supervisor 6.0
          Initial release

Version 1.1   4 June 1982
     Diagnostic supervisor 6.5
          Added local loopback option so the diagnostic
          could run without the turnaround connectors.
          Added configuration section.
          Changes to make the diagnostic work
          effectively on the VAX-11/780.

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